PATENT SPECIFICATION

966,137

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Fluid Flow Control Means

We: GIRLING LIMITED, a British Company of Kings Road, Tyseley, Birmingham 11, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to improvements in fluid flow control means of the kind comprising a substantially flat disc of resilient material which is located in a plane at right angles to the direction of flow and in which are formed a number of slits defining between them resilient tongues which can yield under differential pressures on opposite sides of the disc.

Our invention comprises fluid flow control means of the kind set forth in which flow under pressure is permitted through the disc in both directions and means are provided for limiting the yielding of the tongues in one direction.

The limitation to the yielding of the tongues in one direction is conveniently provided by a stop which is located on one side of the disc and the yielding of the tongues in the opposite direction is unrestricted whereby for a given pressure the flow of fluid through the disc in the one direction is restricted compared with that in the opposite direction.

Where the disc has slits defining between them sector-shaped tongues the stop conveniently comprises a wall or partition of concave or shallow frusto-conical shape having a central opening for the passage of fluid and located against one end face of the disc.

At low fluid pressures, the disc or plate remains flat and fluid can only pass through the slits at a rate of flow governed by the width of the slits. When the pressure increases the tongues flex in the direction of flow and their adjacent edges move apart so that the effective area of the passage for the fluid increases as the pressure increases.

The pressure at which the sector-shaped tongues flex depends on the thickness of the disc and on the inherent stiffness of the material of which it is made.

These can be selected so that no flexing takes place below a predetermined pressure.

One form of flow control device in accordance with our invention is illustrated by way of example in the accompanying drawings in which:—

Figure 1 is an end view of the device,

Figure 2 is a section on the line 2—2 of Figure 1 showing the control disc in its normal unstressed condition,

Figures 3 and 4 are sections similar to Figure 2 but showing the form assumed by the disc under flow through it in opposite directions.

The device illustrated is designed to be incorporated in a fluid flow system in which restriction of flow is required to be greater in one direction than in the other.

The body of the device is a sheet metal pressing having a peripheral flange 10 and an end wall 11. There is a central opening 12 in the end wall and the portion of the wall around the opening has the form of a very shallow cone 13 inclined in a direction away from the flange 10. Alternatively, the part 13 may be flared in a concave shape.

There is mounted in the body a control disc 14 of nylon or other material of similar physical properties.

The disc is formed with a peripheral rim 15 of substantial thickness which is a push-in fit within the flange 10. Five radial slits 16 are formed in the disc radiating from its centre and terminating short of the rim 15 as shown in Figure 1.

When the pressure of fluid flowing through the device is insufficient to flex the sector-shaped tongues 17 between the slits fluid can only pass through the disc at a rate of flow governed by the width of the slits.

When the pressure increases sufficiently the tongues 17 flex in the direction of flow so that there are Vee-shaped gaps between the adja-

[*Price 4s. 6d.*]

cent edges of the tongues, the effective area of the gaps increasing as the pressure increases.

If the direction of flow is that shown by the arrow in Figure 3 there is no restriction on the extent to which the tongues 17 can flex so that the area of the gaps for the passage of fluid can increase progressively as the pressure increases.

If the direction of flow is that shown by the arrow in Figure 4 the tongues 17 after a certain amount of flexing engage the coned portion 13 of the end wall of the body which forms a stop limiting the extent of the flexing and hence the maximum area of the passage for fluid.

The control member has been referred to herein as a disc, but it will be appreciated that it may be of an outline other than circular according to the position in which it is used, and the term disc is intended to include outlines other than strictly circular.

It will also be appreciated that while there are five radial slits in the disc illustrated there may be three, four or more slits.

WHAT WE CLAIM IS:—

1. Fluid flow control means of the kind set forth in which flow under pressure is permitted through the disc in both directions and means are provided for limiting the yielding of the tongues in one direction.

2. Fluid flow control means of the kind set forth in which a stop is provided on one side of the disc to limit the extent to which the resilient tongues can yield under fluid pressure in one direction, the yielding of the tongues in the opposite direction being unrestricted whereby for a given pressure the flow of fluid through the disc in the one direction is restricted compared with that in the opposite direction.

3. Fluid flow control means as claimed in Claim 2, in which the disc is formed with angularly spaced radial slits defining sector-shaped tongues and the stop comprises a circular wall or partition of concave or shallow frusto-conical shape having a central opening for the passage of fluid and located against one end face of the disc.

4. Fluid flow control means as claimed in Claim 2 in which the disc is formed of nylon and has a peripheral rim of substantial thickness.

5. Fluid flow control means substantially as described with reference to the accompanying drawings.

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966137 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

FIG.1.

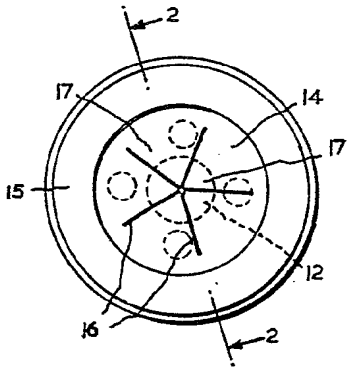

FIG.2.

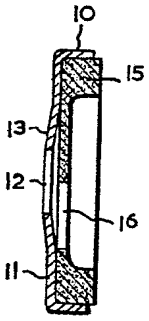

FIG.3.

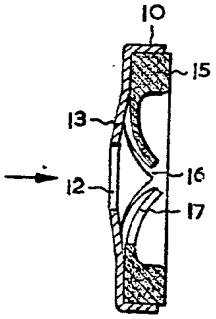

FIG.4.